



## Spokesperson's Welcome

Roman Pöschl



CALICE Collaboration Meeting IFIC/Valencia and virtual – April 2022

**AITANA**

**IFIC**  
INSTITUT DE FÍSICA  
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**UNIÓN EUROPEA**  
Fondo Europeo de  
Desarrollo Regional

**AIDA  
innova**

**Casa  
de la Ciència**  
VALÈNCIA

**ue**  
FUNDACIÓ  
UNIVERSITAT EMPRESA  
UNIVERSITAT ID VALÈNCIA

- On behalf of the collaboration I would like to thank CSIC and IFIC for hosting us for this meeting
- The local organisation was ensured by  
Adrian Irles, Iulia Mich (ADEIT Secretary)
- IFIC Group is member of CALICE since 2020
  - Activities in silicon-tungsten electromagnetic calorimeter
  - Leading role in running current SiW-ECAL prototype
- Thanks to the conveners for having compiled the program
  - ... in particular for their reactivity even over the long Easter weekend

Thank you very much for coming to this CALICE Meeting

- Taikan is the first overseas participant since meeting at McGill in March 2020
- Still, the pandemic is not over yet ...

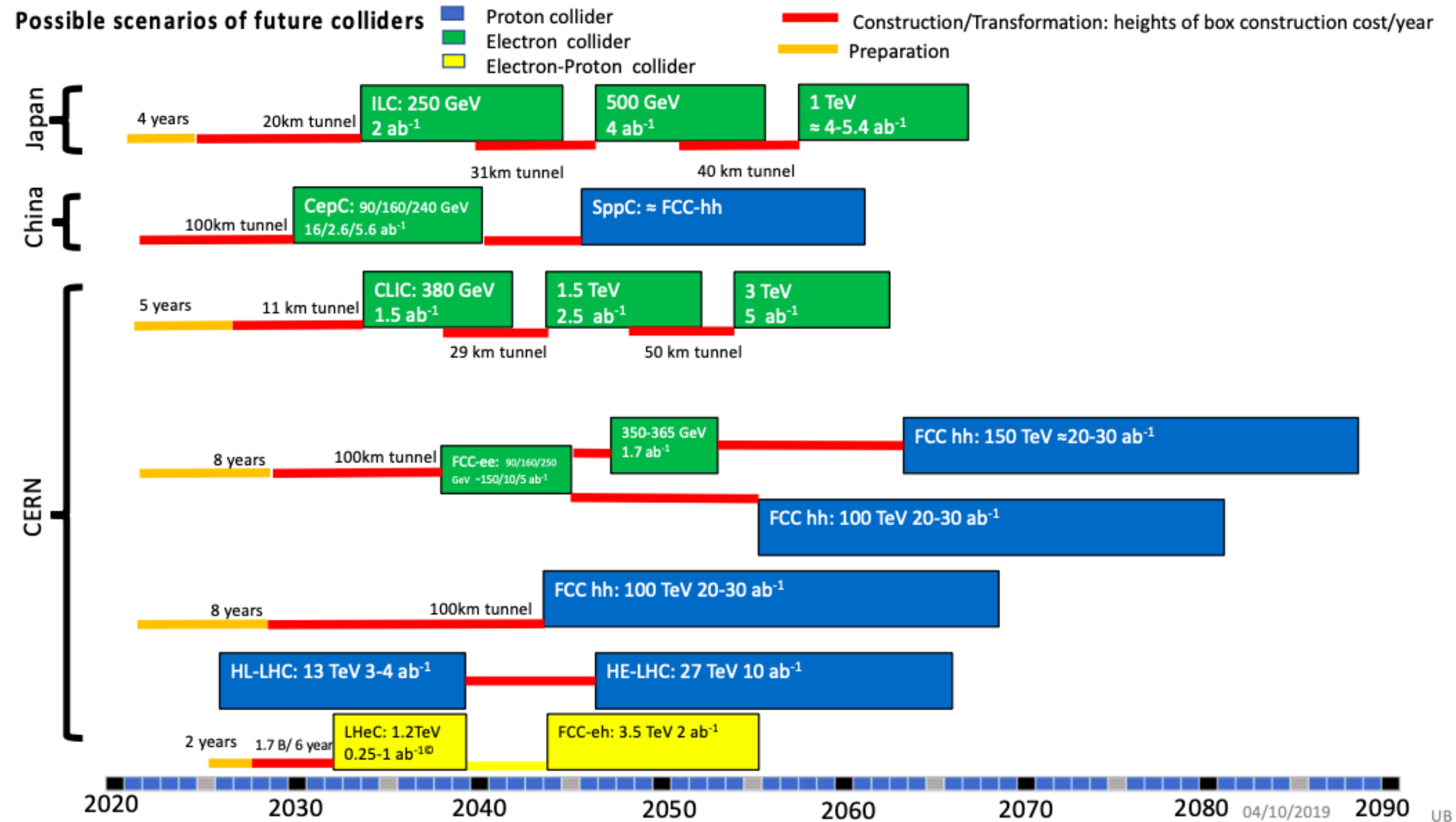
**CALICE condemns by all means the brutal war unleashed on Ukraine by the Russian Government**

**We are shocked by the atrocities that we have to learn about every day**

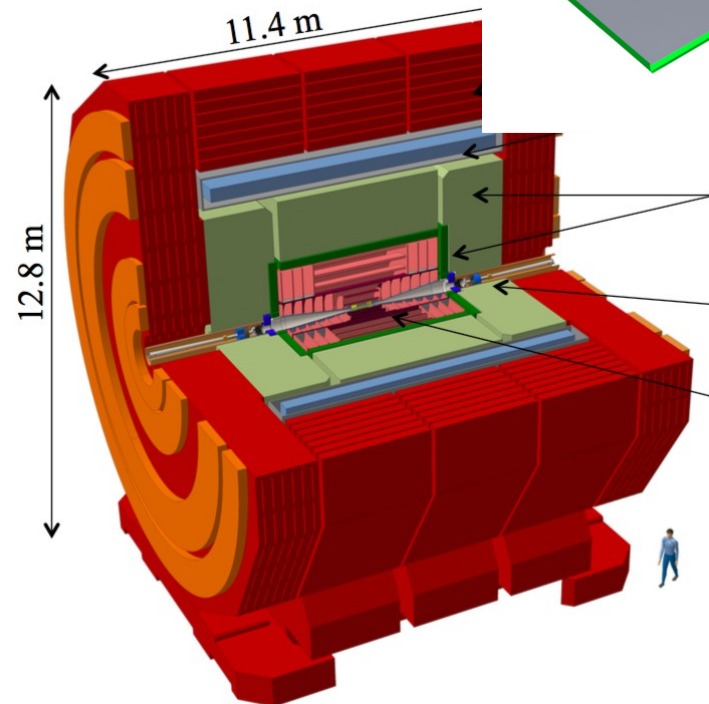
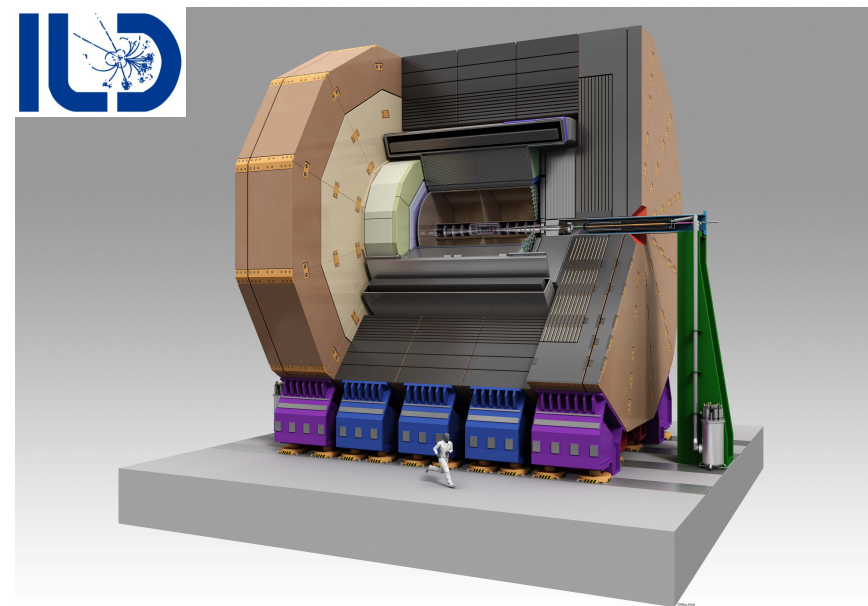
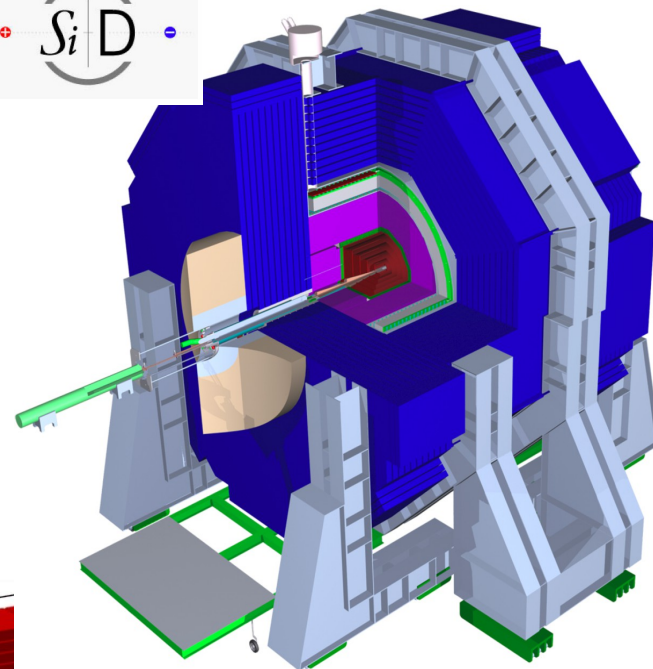
**We salute those who stand with courage against this war, in Ukraine and in Russia**

**CALICE will remain a place for peaceful international scientific and cultural exchange**

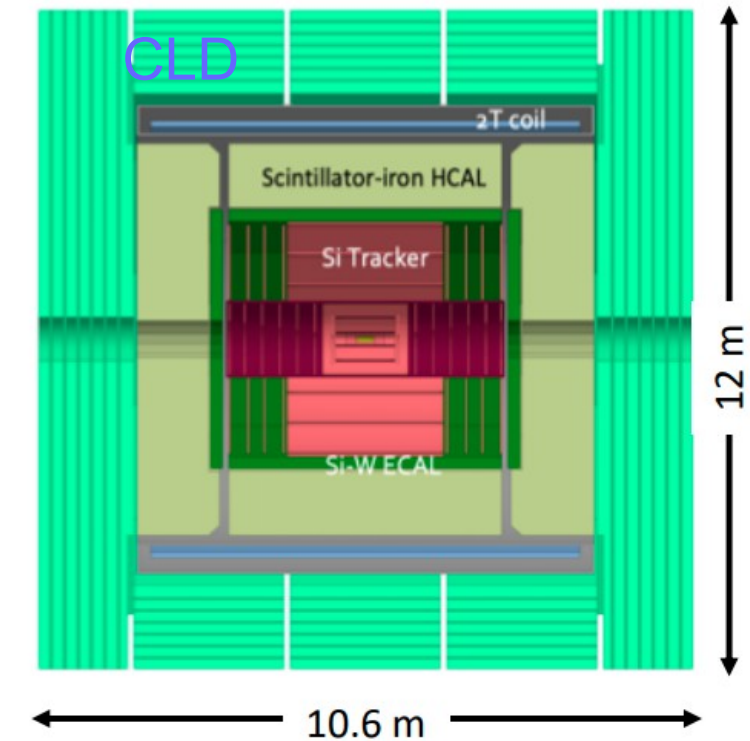
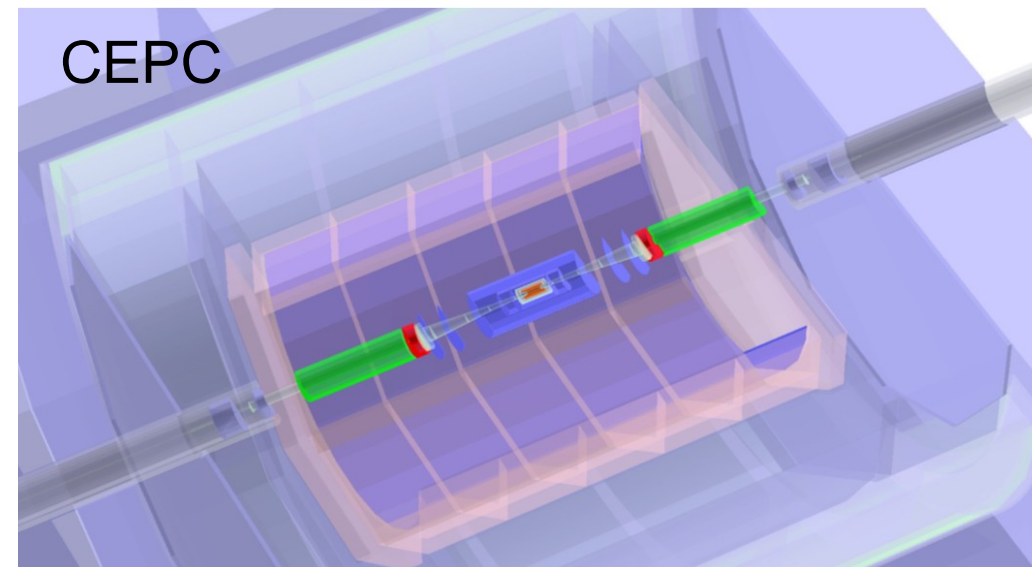
- The war leads to profound changes of our way we'll make science now and in the future
- National governments and institutes have spoken out sanctions of different severity
  - From nothing to suspending all forms of collaboration
  - Note here that CERN Council has increased the level of sanctions on March 25<sup>th</sup> and analyses the consequences of the suspension of the international cooperation agreements with the Russian Federation and with the Republic of Belarus
- As of March 17<sup>th</sup> 2022 Russian Institutes have been excluded from the CALICE Institution Board
- Further measures have been concluded by the Institution Board on its session on April 13<sup>th</sup> 2022
  - See Frank's talk
- Personal remark: Despite the rightful sanctions imposed on Russian Institutes it is important to keep open channels for communication and scientific collaboration





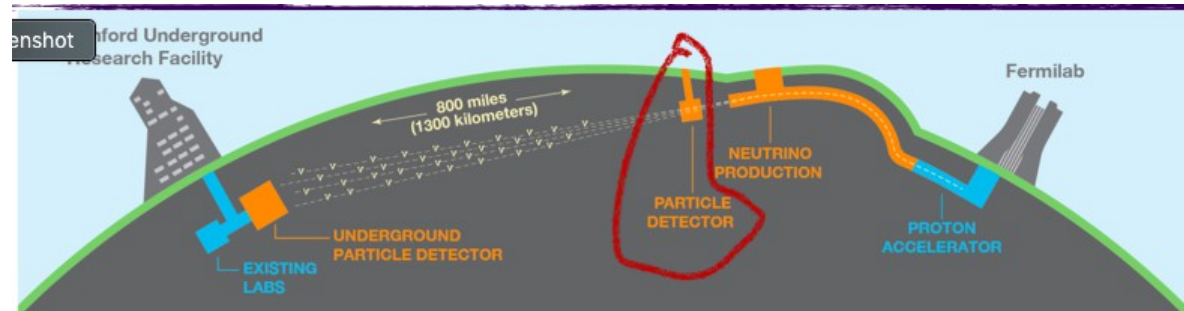


CEPC

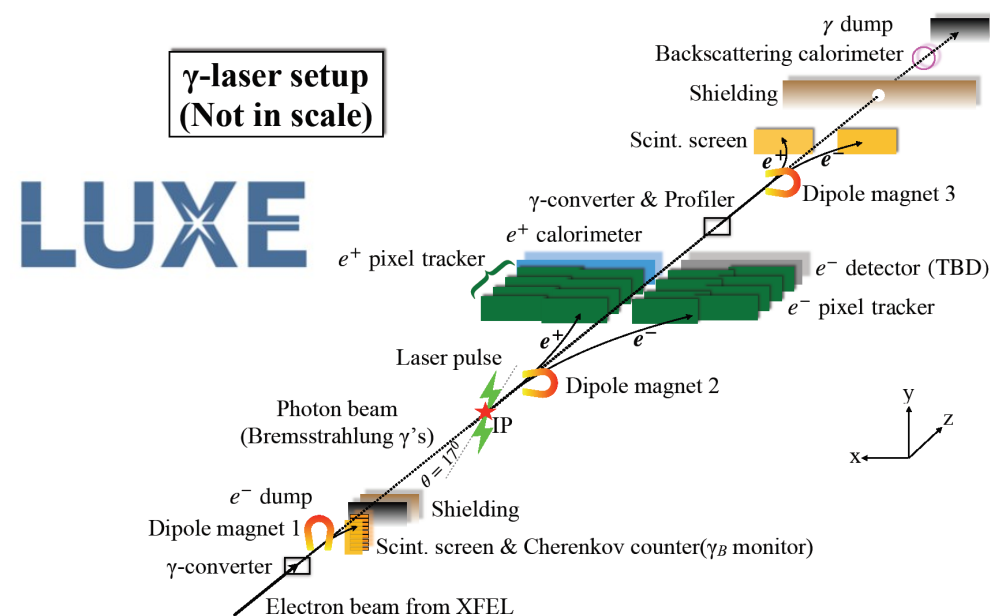


All planned e<sup>+</sup>e<sup>-</sup> facilities feature at least one PFA detector with “CALICE Style” calorimeters

- PFA Calos also under discussion for DUNE



- DUNE Near Detector
- Scintillator tiles/srtips



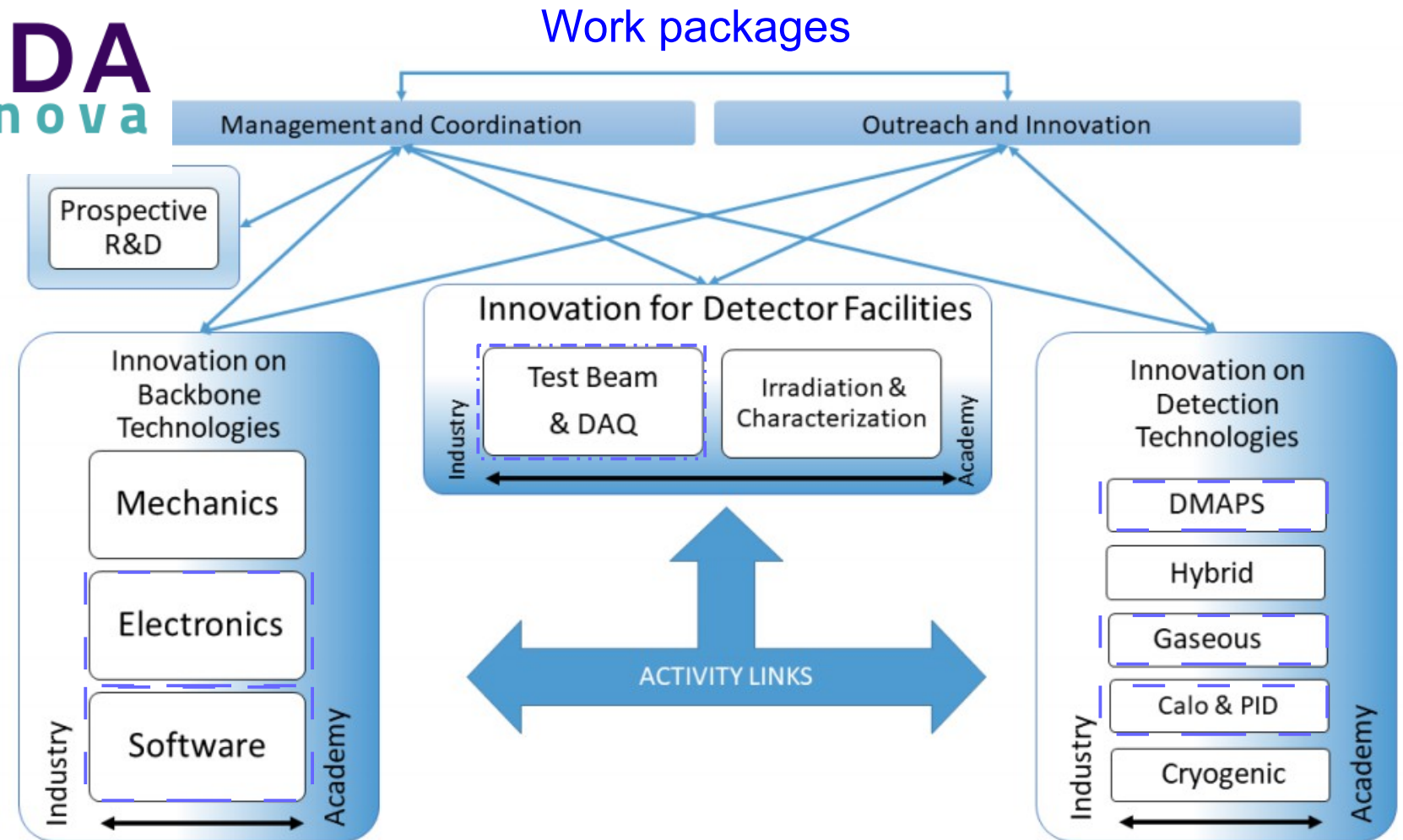
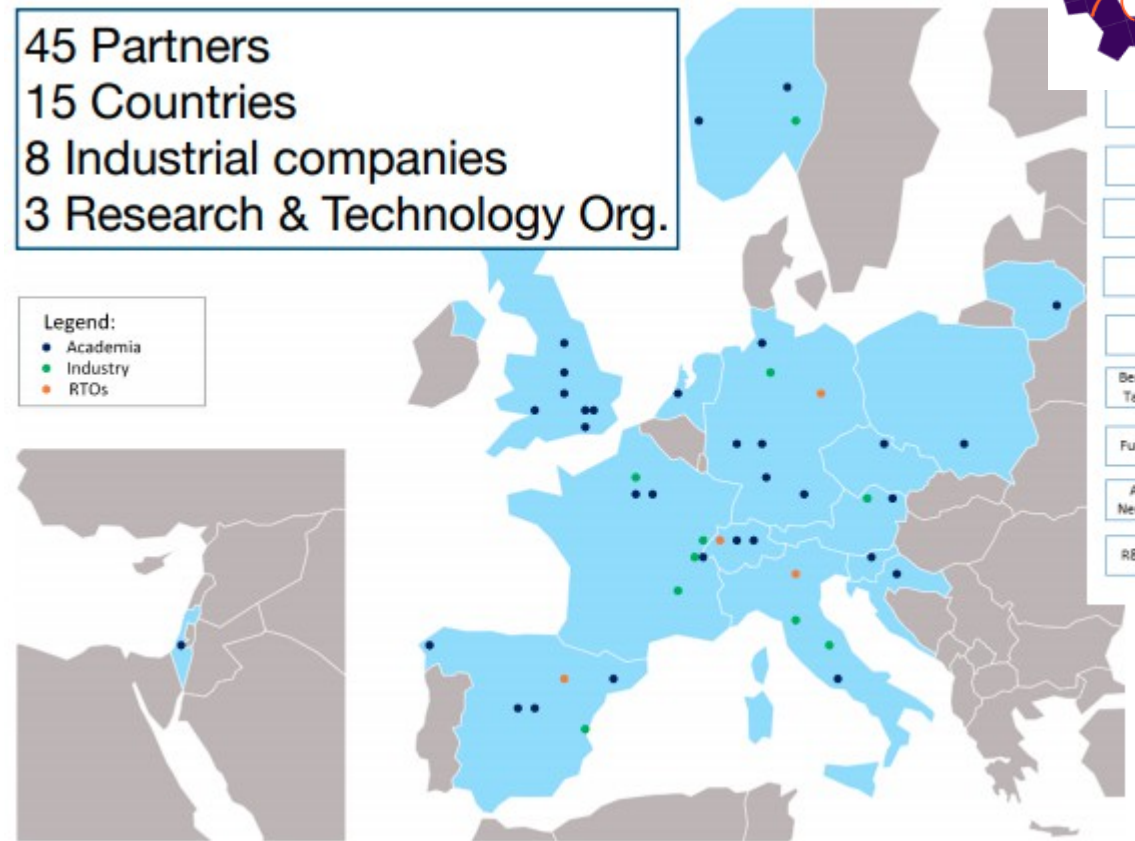
- Smaller experiments on dedicated topics
  - LUXE (Experiment at DESY XFEL to test QED)
    - See W. Lohmanns talk at CALICE Spring 2021 Meeting
  - Beam dump experiments
    - See Taikan's talk at this meeting
  - These need rather the compact elm. prototypes
- Recently the idea was brought up of continuous use of prototypes to test GEANT4 and to constitute platform for machine learning algorithms

- Personally I believe that these are absolutely interesting perspectives worth to be implemented
  - Must not underestimate the effort
  - Requires sustained support by funding agencies
  - Funding in reply to calls for projects would be tedious

- ... is not getting easier
- Remember e+e- Higgs Factory is priority of European Strategy Update after HL-LHC
- Several studies are ongoing
  - Feasibility study for FCC
    - Midterm report for 2023
  - ILC Pre-lab
    - Considered “premature” by Japanese MEXT Advisory Committee
      - N.B.: Report advocates worldwide coordination of large scale science projects
    - Mandate of International Development Team (IDT) has just been renewed
  - CEPC is heading towards the TDR
- “Cross talk” by ECFA Higgs Factory Study and the Snowmass process
- Organisation of necessary R&D and/or final steps towards construction of experiments/calorimeters



## Map of participants



- European project for detector development targeting advanced communities
  - To unfold synergies and enhance coherence in European detector R&D
- Project started on April 1<sup>st</sup> 2021
  - First Annual Meeting 28-31 of March 2022 <https://indico.cern.ch/event/1003419/timetable/#20210413.detailed>
- Close coordination with European Detector R&D Roadmap and developments in other regions
- CALICE activities spread over several workpackages



- Roadmap document published on October 21<sup>st</sup> 2021 after presentation to CERN Council and CERN SPC
  - <https://cds.cern.ch/record/2784893>
  - Well received by Council and SPC!
- Content presented at several occasions to community
  - e.g. LP2021, VCI2022 by Susanne Kühn
- **CALICE@Roadmap Document**
  - Coordination Group: Felix Sefkow
  - TF6 – Calorimetry: R.P., Frank Simon
  - TF7 – Electronics: Christophe de la Taille
  - TF9 – Education and outreach: Erika Garutti

## Assumed earliest starting dates of major facilities



## Detector Research and Development Themes (DRDT) – Calorimetry (full list see backup)



- ECFA has been charged by CERN Council with working out proposals for the implementation of the roadmap
- More details by Felix on Thursday













- Community study to prepare update of US Strategy on Particle Physics “P5 Process”
  - <https://snowmass21.org/start>
- (For us most relevant)
- Instrumentation Frontier Working Group 6 – Calorimetry
  - Co-chaired by Andy White
- Letters of Interest until 31<sup>st</sup> of August 2020
  - Letters submitted by CALICE
    - Organised through Technical Board
- Snowmass process is approaching its conclusions
  - White papers submitted until March 15<sup>th</sup> 2022 (see next page)
  - Update on restart by Andy on Thursday
- With the European Roadmap being finalised CALICE has high interest to engage more with the Snowmass process

CALICE Letters of Interest submitted to US Snowmass 2021 Community Study (August 31, 2020) · ILC Agenda (Indico) 25/09/2020 23:08

### CALICE Letters of Interest submitted to US Snowmass 2021 Community Study

Monday Aug 31, 2020, 10:00 AM → 8:00 PM Europe/Zurich

|   |  |     |
|---|--|-----|
| 10:00 AM → 10:10 AM   | Physics potential and prototyping of technological solutions for timing layers in highly granular calorimeters | 10m |
| Lol ID: SNOWMASS21-IF6_F9_CALICE-038<br> SNOWMASS21-IF6...           |  |     |
| 10:10 AM → 10:20 AM   | Development of Highly Granular Scintillator Strip Electromagnetic Calorimeter                                  | 10m |
| Lol ID: SNOWMASS21-IF6_F9_CALICE-058<br> SNOWMASS21-IF6...           |  |     |
| 10:20 AM → 10:30 AM   | CALICE R&D for a highly granular silicon tungsten electromagnetic calorimeter, SiW-ECAL                        | 10m |
| Lol ID: SNOWMASS21-IF6_F9_CALICE-077<br> SNOWMASS21-IF6...           |  |     |
| 10:30 AM → 10:40 AM   | CALICE R&D for compact readout systems for highly granular calorimeters  | 10m |
| SNOWMASS21-IF6_F9_CALICE-082<br> SNOWMASS21-IF6...                   |  |     |
| 10:40 AM → 10:50 AM   | Developments Towards a SiPM-on-Tile Based Analogue Hadron Calorimeter (AHCAL)                                  | 10m |
| Lol ID: SNOWMASS21-IF6_F9_CALICE-099<br> SNOWMASS21-IF6...         |  |     |
| 10:50 AM → 11:00 AM   | Timing Semi-Digital Hadronic Calorimeter (T-SDHCAL)  | 10m |
| Lol ID: SNOWMASS21-IF6_F9_LakShmi-Calice-050<br> SNOWMASS21-IF6... |  |     |
| 11:00 AM → 11:10 AM   | High-Granularity Crystal Calorimetry Letter of Intent  | 10m |
| Lol ID: SNOWMASS21-IF6_F9_Yong_Liu-064<br> SNOWMASS21-IF6...       |  |     |
| 11:10 AM → 11:20 AM   | Digital Hadron Calorimetry   | 10m |
| Lol ID: SNOWMASS21-IF6_F9_Yasar_Ozal-048<br> SNOWMASS21-IF6...     |  |     |
| 11:20 AM → 11:30 AM   | Towards ultra-high granularity calorimetry   | 10m |
| Lol ID: SNOWMASS21-IF6_F9-067<br> SNOWMASS21-IF6...                |  |     |
| 11:30 AM → 11:40 AM   | Novel silicon sensors for high-precision 5D calorimetry  | 10m |
| Lol ID: SNOWMASS21-IF6_F9-078<br> SNOWMASS21-IF6...                |  |     |

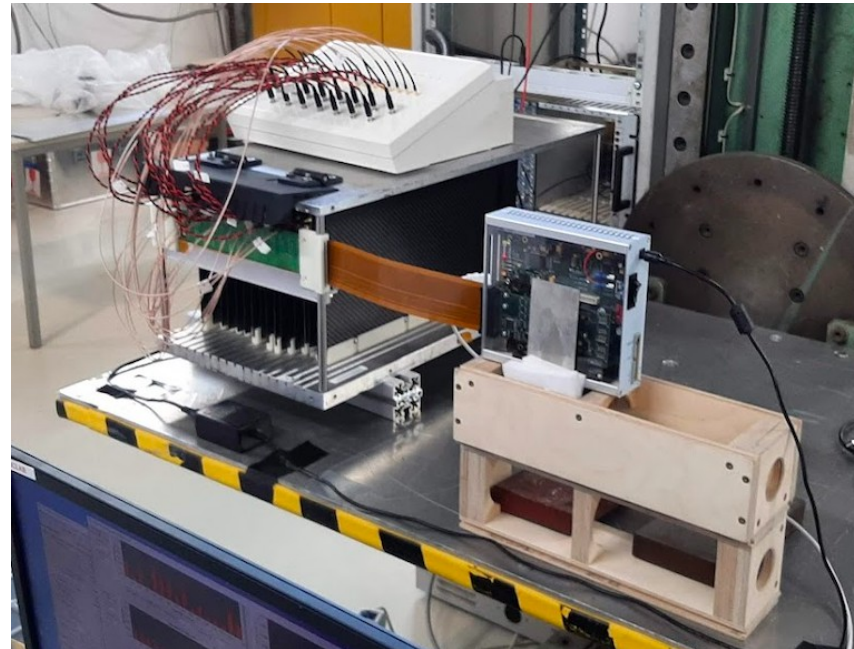
<https://agenda.linearcollider.org/event/8647/>  
https://agenda.linearcollider.org/event/8647/?print=1 Page 1 of 1

## IF06: Calorimetry

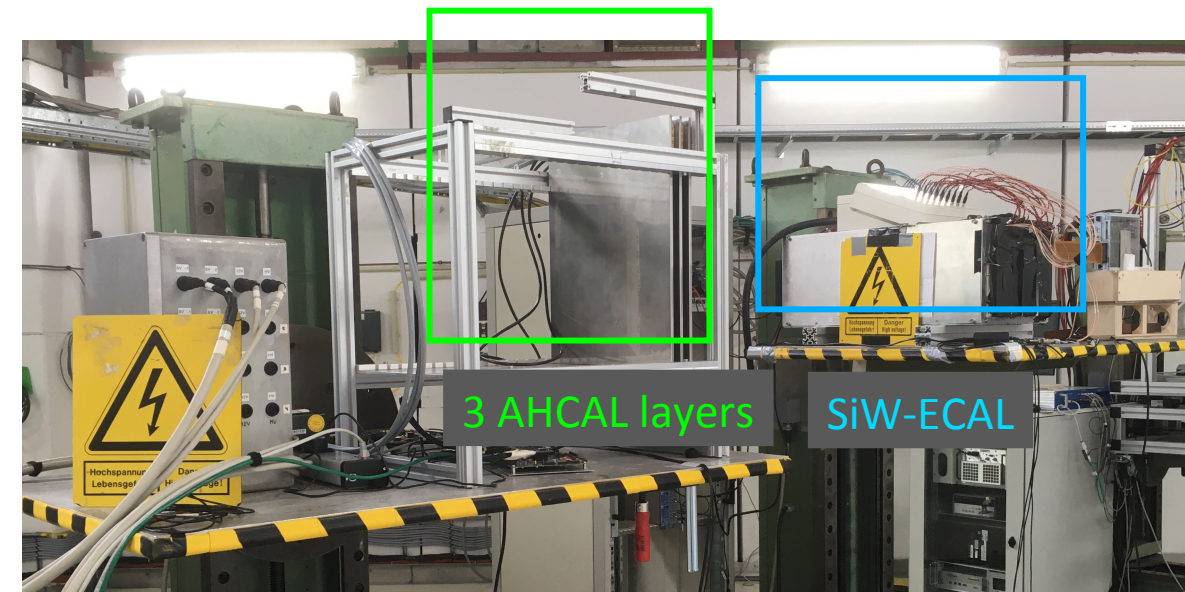
- C.-H. Yeh, S. V. Chekanov, A. V. Kotwal, J. Proudfoot, S. Sen, N. V. Tran, S.-S. Yu,  
“Studies of granularity of a hadronic calorimeter for tens-of-TeV jets at a 100 TeV pp collider”, arXiv:1901.11146 [physics.ins-det] (pdf). (also under EF09)
- S. V. Chekanov, A. V. Kotwal, C.-H. Yeh, and S.-S. Yu,  
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- I. Pezzotti, Harvey Newman, J. Freeman, J. Hirschauer, et al. “Dual-Readout Calorimetry for Future Experiments Probing Fundamental Physics”,  
arXiv:2203.04312 [physics.ins-det] (pdf).
- Minfang Yeh, Ren-Yuan Zhu. “Materials for Future Calorimeters“, arXiv:2203.07154 [physics.ins-det] (pdf).
- **S. V. Chekanov, F.Simon, V. Boudry, W. Chung, P. W. Gorham, M. Nguyen, et al.**  
“Precision timing for collider-experiment-based calorimetry”, arXiv:2203.07286 [physics.ins-det] (pdf).
- Chen Hu, Liyuan Zhang, Ren-Yuan Zhu. “Inorganic Scintillators for Future HEP Experiments“, arXiv:2203.06731 [physics.ins-det] (pdf).
- Chen Hu, Liyuan Zhang, Ren-Yuan Zhu. “Ultrafast Inorganic Crystals with Mass Production Capability for Future High-Rate Experiments”,  
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- David R Winn. “Novel Low Workfunction Semiconductors for Calorimetry and Detection: High Energy, Dark Matter and Neutrino Phenomena”,  
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- David R Winn, Yasar Onel. “Photomultipliers as High Rate Radiation-Resistant In-Situ Sensors in Future Experiments“, arXiv:2203.09941 [physics.ins-det] (pdf).
- T. Anderson, T. Barbera, D. Blend, N. Chigurupati, B. Cox, P. Debbins, et al.  
“RADICAL: Precision-timing, Ultracompact, Radiation-hard Electromagnetic Calorimetry”, arXiv:2203.12806 [physics.ins-det] (pdf). (also under EF04)
- **Randal Ruchti, Katja Krüger.** “Particle Flow Calorimetry”, arXiv:2203.15138 [physics.ins-det] (pdf). (also under EF0)
- Sergey Pereverzev, Gianpaolo Carosi, Viacheslav Li.  
“Superconducting Nanowire Single-Photon Detectors and effect of accumulation and unsteady releases of excess energy in materials”,  
arXiv:2204.01919 [quant-ph] (pdf). (also under NF0, CF0)



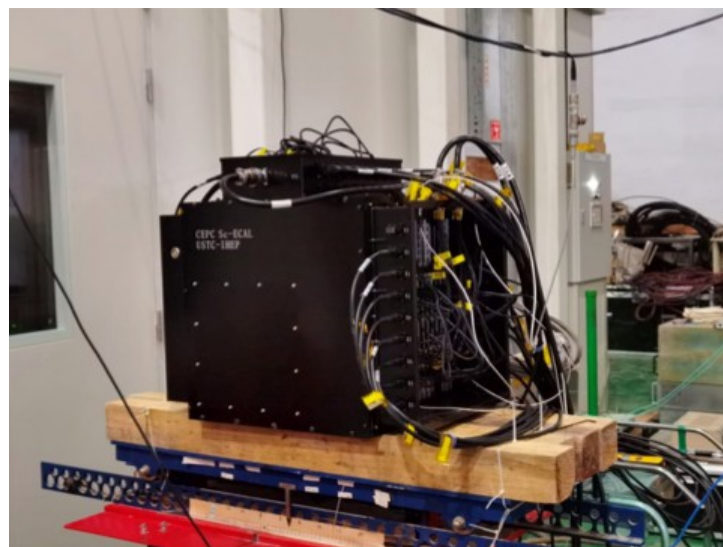
SiW ECAL at DESY (Nov. 2021 and March 2022)



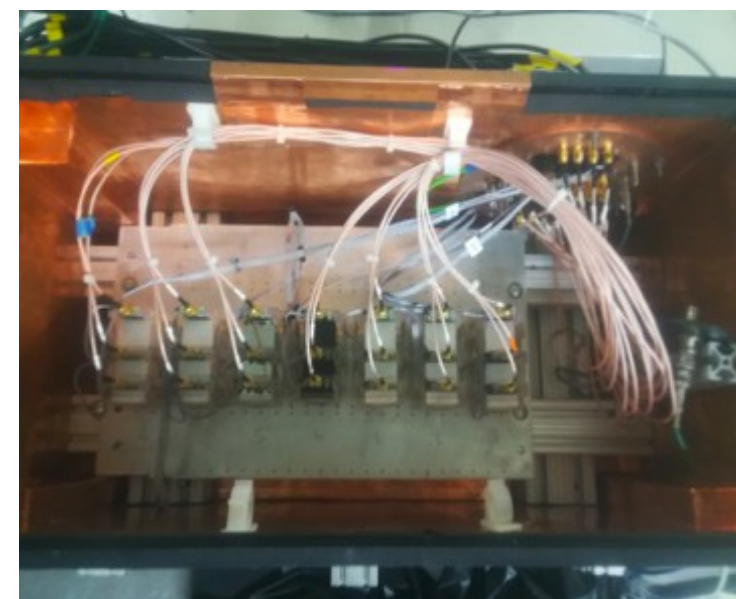
SiW-ECAL + AHCAL DAQ test @ DESY in March 2022



ScEcal at BEPC II



Dual Readout Tiles (Dec. 2021)



## Proposal for SPS beam time for the CALICE calorimeter prototypes

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<sup>4</sup>Department of Modern Physics, University of Science and Technology of China, 96 Jinzhai Rd, Hefei, Anhui, 230026, China

<sup>5</sup>Institute of High Energy Physics, Chinese Academy of Sciences, 19B Yuquan Road, Shijingshan District, Beijing, China

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<sup>7</sup>ICEPP, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, 113-0033, Japan

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<sup>9</sup>SJTU, Tsung-Dao Lee Institute, Shanghai Jiao Tong University, 800 Dongchuan Road, Shanghai, 200240, China

### Abstract

This note contains the requests of the CALICE collaboration for beam test time at the CERN SPS for the year 2022. Beyond the actual requests, it gives background information on the CALICE programme and the calorimetric devices to be tested. CALICE asks in total for 6 weeks of time on beam, mainly dedicated to the test of three systems of electromagnetic and hadronic calorimeters taking combined data. The aim of these tests is both of technological and physical nature: to develop and consolidate the common operation of large prototypes of high granular calorimeters and to study the development of hadronic showers in different materials leading to improved simulations. In the near future, low power continuous readout and the further addition of timing information will extend the area of possible application of highly granular calorimeters to all the main experiments considered for the future of particle physics.

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Editor of this document and Chair of the CALICE Technical Board:

*Lucia Masetti (Mainz), masetti@uni-mainz.de*

They serve as a primary contact in case of additional questions on project plans and will establish the contact to the various groups.

CERN-SPSC-2022-011 / SPSC-P-341-ADD-2  
23/03/2022



- CERN-SPS-2022-011
- Coordinated by CALICE Technical Board Chair Lucia Masetti
- Authored by representatives of technologies and setups
  - Three different setups are going to be tested in 2022
    - SiW-ECAL + AHCAL
    - SDHCAL (+SiW-ECAL)
    - Sc-ECAL + AHCAL (with new type of layers)
- Common edition supports coherent beam test plans
- SPS-C Meeting 12/4/22:
  - Report by SPS-C Committee still outstanding
  - Tendency see talk by Lucia



- On January 24<sup>th</sup> 2022 CALICE has signed the Diversity Charter formulated by ECFA-NUPECC-APPEC



## Diversity Charter Agreement

The CALICE Collaboration agrees to support the Diversity Charter of APPEC, ECFA and NuPECC in all its contents and to provide the monitoring data as indicated in it.

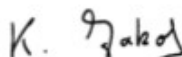
Date and place, Orsay, 24/01/22

  
 Roman Pöschl, IJCLab  
 Spokesperson of the CALICE Collaboration

Representative and  
Organisation name



Andreas Haungs  
Chair of APPEC



Karl Jakobs  
Chair of ECFA



Marek Lewitowicz  
Chair of NuPECC

- More details on the Charter under
- Version of 23<sup>rd</sup> June 2021
    - Signed version takes into account concerns formulated by CALICE w.r.t. first version from Summer 2020
  - Let me thank the sub-panel for their collaboration on this topic
    - Three meetings since Autumn 2020
    - Lucie Linssen, Jihane Maalmi, Marina Chadeeva, MaryCruz Fouz, Marisol Robles, Lucia Masetti, Erika Garutti, Frank Simon Francois Corriveau, Taikan Suehara
  - The signing comes along with obligation for monitoring certain parameters
    - The IB will be in charge of this

- In 2020 CALICE has been invited to contribute to the JENAS Recognition Working Group
  - Participation in two meetings
  - Answers to set of questions on CALICE Wikipage
  - Motivates the creation of the CALICE ECR Forum

## Draft of summary report from 18/3/222

### Recognition of Individuals in Large Collaborations

#### Summary Report

18-03-2022

APPEC-ECFA-NuPECC (JENAS) working group

Diamel Boumediene, Emmanuel Gangler, Nasser Kalantar, Karl-Heinz Kampert,  
Bogna Kubik, Marcel Merk, Gerda Neyens, Eberhard Widmann

- CALICE Feedback to initial set of questions recognised in report

ECFA collaborations:

ATLAS, AWAKE, CALICE, CAST, CMS, COMPASS, DUNE, LHCb, NA61/SHINE, NA62, SoLid.

- Feedback to draft until April 20<sup>th</sup> 2022 (today)
  - A little later will hopefully not harm
  - Attached to my talk

- 80 registered participants
  - A hybrid meeting with 25 registered on-site participants
  - Thanks to the conveners for having compiled the agenda
- Interesting scientific program
  - First feedback on 2021/22 beam tests, more to come
  - Retightening the links with GEANT4 team
  - CALICE in international landscape
  - More and more talks on timing (hard and software)
  - “Other Application” Session on Beam dump experiments
- CALICE well integrated into international landscape
  - Scientific: Present in roadmap and strategy groups/efforts
  - “Societal”: Active on topics as diversity and recognition
    - ECR Forum on Thursday



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**AHCAL:** Katja Krüger ([katja.krueger@desy.de](mailto:katja.krueger@desy.de)), Wataru Ootani ([wataru@icepp.s.u-tokyo.ac.jp](mailto:wataru@icepp.s.u-tokyo.ac.jp))

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Backup



## 2020 Strategy Statements

### 4. Other essential scientific activities for particle physics

#### Instrumentation R&D critical for present and future endeavours

- Delivering the near and long-term future research programme requires advances in instrumentation through focused and transformational R&D
- There is a clear need to strengthen existing R&D collaborative structures and to create new ones, and to foster an environment that stimulates innovation and collaboration with industry
- The National Laboratories and research institutes in Europe play a central role by providing access to dedicated infrastructures and test facilities, specialised expertise and user support
- A roadmap should be developed by the community (ECFA's role) taking into account progress with emerging technologies in adjacent fields

c) The success of particle physics experiments relies on innovative instrumentation and state-of-the-art infrastructures. To prepare and realise future experimental research programmes, the community must maintain a strong focus on instrumentation. *Detector R&D programmes and associated infrastructures should be supported at CERN, national institutes, laboratories and universities. Synergies between the needs of different scientific fields and industry should be identified and exploited to boost efficiency in the development process and increase opportunities for more technology transfer benefiting society at large. Collaborative platforms and consortia must be adequately supported to provide coherence in these R&D activities. The community should define a global detector R&D roadmap that should be used to support proposals at the European and national levels.*

19/06/2020

CERN Council Open Session

23

*H. Abramowicz, Strategy Secretary*

- The CNRS/IN2P3 and the German Helmholtz Association are about to found a common research laboratory



- DMLAB created technically by CNRS
- MOU under negotiation
- Particle Flow Calorimetry among scientific projects within this IRL
  - Topic carried by CALICE Members
- Kick-off planned 2021